INTRODUCTION
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All living organisms build for themselves some sort of shelter for safe rest. For shelter, man selects tree branches, caves or pits or rock cut hiding places. These shelter places become the most concrete expressions of human cultural activity and assume various forms as well as names like houses, dwellings, abodes and habitations. These all form human habitat more specifically settlements. Settlements occupy an important position among all the visual imprints made by man upon the physical landscape through the process of cultural occupancy since the dawn of human civilization.

The study of settlements forms one of the most important themes of human geography. The term ‘settlement’ is generic and of multiple connotation and varying use. In the Oxford Dictionary the ‘settle’ means to establish or become established in more or less permanent abode or way of life while its derivatives noun form (settlement) means ‘the act of settling down’. Settlement thus means an establishment and abode with an established way of life.

The geographical study of rural settlements begins with Ritter’s work in the early nineteenth century. Since then both the content and the methodology of this study have been developed principally within a German and French context while in England rural settlement geography is a
relatively recent branch of human geography. During the sixties, Stone
suggested that 'geography of rural settlements be defined as the
description and analysis of the distribution of buildings by which people
attach themselves to the land for purpose of primary production.¹ But he
excluded some significant constituents like building materials, architectural
styles, land use and fence types. A year later, his ideas were challenged by
Jordan who defined settlement geography is the study of the form of the
cultural landscape involving its orderly description and attempted
explanation. Later on he emphasized three aspects of the cultural
landscape:(i) the settlement patterns or distribution of farmsteads, (ii) the
field pattern, or the form resulting from division of land for productive use,
and (iii) house and farmstead type including the building materials and folk
architecture.² This definition was internationally accepted without any
hesitation.

R.L. Singh is of the opinion that settlement geography deals with the
facilities built in the process of human occupancy of land and their
grouping. The nature and distribution of these facilities are related to the art
and mode of living on the one hand and on the other to such physical
factors as water supply, slopes, forests and swamps. These are designed
and grouped to serve specific purposes, and as such carry functional

meaning. Houses and highways, the two basic facilities of settlement, are topographic expressions of their grouping or arrangements. Their external forms reflect architectural styles of their time and thus they reflect changes in human occupancy of an area, often being the only relict of expressions of the past cultural landscapes. Settlement as an occupancy unit represents thus an organized colony of human beings, including the buildings in which they live or work or store or use them otherwise and the tracks or streets over which their movements take place. Even their rudimentary forms as expressed by the temporary camps of the hunter or the herder, including the one-wall houses of Semangs of Malaya, reflect some human ingenuity and its act of the environment. Thus the centre of interest in settlement geography is man and the reciprocal relationships between human occupancy features and environment.¹

Settlement geography, being an offshoot of social geography² or a recent most sprout from the venerable trunk of human geography³ was mainly concerned with urban settlements before the turn of the twentieth century. But, since about two-thirds of the world population and about 66 per cent of the total settlements occupy rural areas, many historians, sociologists and geographers have studied rural settlements and the problems attached with environmental aspects in rural areas. Even

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urbanized world still possesses varied forms of rural settlements. Thus, a comprehensive study of settlements requires explanation of site and situation, building materials, forms including architectural style, functions, types and patterns, and characteristics. Of these, site and situations and materials need full interpretation of physical and cultural linkages while morphology requires in-depth study of sequent occupance involving historical background. As the past is the key to the present and we walk to a certain degree in every village among the ruins of antiquity\(^1\), that involves archaeological analysis to understand the ground reality. The place name study serves remarkably in reconstructing the sequent occupance.

The range of subject matter varies from herder's hut in a pioneer fringe to a skyscraper in New York. Obviously, the city geography is at one end of the scale of settlement, pioneering at the other.\(^2\) Keeping this view in mind, the totality of the human community in rural areas includes the social, material, organizational, spiritual and cultural elements are necessarily required for sustaining of human living. Under physical requirements as housing, work, energy supply, transport, communication, water availability, education, health, protection and social welfare, system of territorial organization, local self-government, law and economic management and cultural facilities for the development of art, recreation and leisure come under his study. Further, with the growth of population, increasing migration

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to rural to urban areas and vice versa, the demand for housing construction for rehabilitation of displaced persons from natural and human born calamities such as earthquakes, floods and sense of insecurity caused insurgency, communal violence etc. are developing wider scope of rural settlements which requires an integrated approach for rational planning and development.

**Approaches of Rural Settlement Studies**

Three basic approaches of studies are employed in rural settlement geography.

**Genetic Approach**

The genetic approach of settlement studies was pioneered by Meitzen (1895). In the 20th International Geographical Congress Symposium (London, 1964), it was emphasized that the scientific study of settlements must be founded on an appreciation of the nature and limitation of historical perspective, whether archeological or documentary. As the core concern of settlement geography is the spatial arrangement and sequent occupancy, the histogenetic approach is most appropriate for studying the degree of continuity of territorial organization and problems of interaction between man and environment. Three basic attributes, i.e., retrogressive, retrospective and prospective are very common for historical perspectives of rural settlement studies. Bloch advocated the first attributes in this context. According to him, retrogressive method is focused upon the past
on the basis of the evidences gathered from the recent past.¹ The second approach, i.e., retrospective, advocated by Roger Dion focuses upon the present, the past conditions regarding settlements being considered for better understanding of the existing state.² The third approach, i.e., prospective, concerns itself with the future, the past and present settlement forms being regarded as relict features for adjustment with future probable needs.³

Place name studies, inter alia are significant approach for reconstruction of cultural landscape through sequent occupancy.

Study of settlements on the basis of diffusion theory is also a significant approach followed by various geographers. Analysis of abandoned settlements, a new approach, provides conclusive evidences about the past settlements and human activities. This approach developed out of archeology, it consists of three parts: (i) chemical analysis of soil phosphorous indicating human occupance, (ii) microseparation examining soil and settlement components primarily through mechanical means and (iii) polynology (pollen analysis). Eidt presented interesting findings in his studies.⁴

Spatial Approach

Spatial organization approach is a form of system approach, which helps in comprehending the settlements as a whole. It may be analyzed through different concepts, among which very pertinent in rural settlement geography are (i) type, pattern and classification, (ii) functional integration and hierarchy, (iii) local identity (e.g., village structure), and (iv) planning and rationalization. Demangeon actually developed the concept of spatial organization in context to morphological structure. He presented the classification of French grouped settlements into different types according to shape. His works paved the way for geographers to produce regional classification of rural settlement types. Schaefer initiated the modern orientation following the works of German geographers. Modern geographers are following him in the study of settlements through the analysis of patterns and processes as they express the spatial organization in environmental space. Through this approach the interrelationship of man, nature and society is better expressed in any cultural landscape. A number of studies on morphology, size and shape of settlements speak some sort of organization of space ranging from a room, hamlet, town to the far off settled megalopolis.

Ecological Approach

The ecological-cultural approach finds its strength through the study of plant ecologists. Plant ecology theories are being applied to explain the process of change in human behavior and settlements over time. Radha Karnal Mukerjee regarding adaptation of human society and ecology produced a fundamental work.¹ The settling process as described by Hudson² includes three phases—colonization, spread and competition—similar to plant communities in space. He concluded that this process follows a cyclic way temporarily. Since much of the human behavior is of sub-optimal nature,³ people in various habitats are often with less than the ideal. Such habitats have been studied by many geographers including Kayastha⁴ and Singh.⁵

The most significant theoretical framework of settlement formation has so far been developed by C.A. Doxiadis.⁶ He sets five principles, illustrated with hypothetical diagrams (Fig.1). The first principle is the maximization of man’s potential contact with natural elements, (e.g., water, water, water).

⁵. Singh, R.Y., (1972), Bhils of Malwa Region-Their Habitat, Economy and Society, Vol, xviii, parts 3&4, pp. 223-239.
FIVE PRINCIPLES OF SETTLEMENT-FORMATION

1ST. MAXIMIZATION OF POTENTIAL CONTACTS
GIVEN CERTAIN CONDITIONS IN A CERTAIN AREA

2ND. AT A MINIMUM OF EFFORT IN TERMS OF ENERGY TIME AND COST

3RD. OPTIMIZATION OF MAN'S PROTECTIVE SPACE IF HE IS ALONE OR WITH OTHERS

4TH OPTIMIZATION OF THE QUALITY OF MAN'S RELATIONSHIP WITH HIS ENVIRONMENT

5TH OPTIMIZATION IN THE SYNTHESIS OF ALL PRINCIPLES

THE FIVE ELEMENTS OF HUMAN SETTLEMENTS ARE NOW OUT OF BALANCE.

FIG. 1
trees, etc.), with other people cultural elements (e.g., buildings, roads, etc.). The second principle is the minimization of efforts required for the achievement of man's actual and potential contacts, according to the general principle of least effort. The third principle is the optimization of man's protective space at every movement individually or in a group, in any situation or locality, whether it is temporary or permanent, whether he is alone or part of a group. The fourth principle is the optimization of the quality of man relationship with his environment, consisting of nature, society, shell (building and houses of all sorts), and networks (lanes, street, road, communications, etc.). The fifth principle is that man organizes his settlements in an attempt to achieve an optimum synthesis of the previous four principles. This optimization works naturally through time and space, as well as the prevailing conditions and man's ability to create a synthesis.

Apart from space articulation or territoriality, there are also other pertinent factors, which are capable of general application. Doxiadis has developed a four fold frame which can be applied to composite individual settlements of all sizes and a territory as well as to its constitently (Fig. ii). Hypothetically, any settlement consists of four parts: (i) homogeneous part, (ii) central part. (iii) circulatory part and (iv) special part. These parts are always subject to change but they are always present in a living settlement.\(^1\)

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PARTS OF HUMAN SETTLEMENTS

Any settlement consists of:

- Homogeneous Part
- Central Part
- Circulatory Part
- Special Part

A village consists of:

- Homogeneous Part (Fields)
- Central Part (Built Up)
- Circulatory Part (Roads and Paths)
- Special Part (Temple)

The built-up area of the village consists again of:

- Homogeneous Part (Houses)
- Circulatory Part (Street)
- Central Part (Shops)
- Special Parts (School or Temple)

Fig. II
Review Work Done so far

A brief review of the work is presented in sequent manner, early description of human settlements are found in the works of Herodotus\(^1\) (440-25) B.C., who wrote about settled places and about the custom of their inhabitants. Strabo\(^2\) (63 B.C–A.D. 20) may be remembered to have been concerned with the occupancy of the land and its dwellings.

Moser\(^3\) (1780) makes an important methodological contribution to settlement analysis after carrying out field investigation of life in northern Germany, he describes individual farm houses and the functions of farm structure and fields, as well as the influence of tradition on settlement pattern.

Arnold\(^4\) (1875) states that place names and history are important for establishing the order of settlement stratification, and that this provides an indirect basis of assessing the factor in the location in the villages.\(^5\)

Finch and Trewartha (1942) mention a number of factors, which determines the pattern of settlements like topography, elevation and slopes, nature of soil, forest, area distribution of nature, existence of springs that contribute to dispersal.\(^6\) Stanislowsky (1946), state that Latin Planning

\(^3\) Moser, J., *Osnabruchische Geschiete, Theel mit Urdenden*, Berlin, 2nd ed. (1780).
\(^4\) Arnold, W., *Ansiedlungen Und Wanderungen deutscher stamme Zumieist nech Hessischem Ortsnaman Marburg*, (1875).
methods were later extended to the new world by the Spanish and the Portuguese who had centuries of experience and operating vilas, pueblos and Ciudades from Roman Structures.¹

Blache (1952) has found that the concentration and description are the results of physical influence on human environment.² He further states that human being select lines to contact between different geological formations and varieties of topography give new and favourable opportunity for their settlement. There is a marked tendency to converge or even to concentrate at the angles of slopes or at the intersection of different gradients.³ Again he says that the agglomeration of settlements itself becomes a locational force for the establishment of settlement. The sum total of human need is after all only a certain amount of variety of food supply, animals, fuel and building materials and so on.⁴

Ahmad⁵ (1952) made a commendable study of the rural settlement types in Uttar Pradesh. He grouped the rural settlements in the types – compact cluster and hamlet, fragmented or hamleted and dispersed settlements. He observed that religious belief and superstitions also exert pressure on the location of rural settlements in the Ganga Yamuna Doab.

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3. ibid., p. 238.
4. ibid., p. 281.
Villagers generally avoided a new site for a house as far as possible. Houses can be built on a new site only after the sanction made by the priest. Moreover the ancestral site of a house is usually regarded as sacred unless the family is in decay. Extension of a settlement on the south and west is forbidden, these two directions being considered inauspicious.

Brunhes¹ (1952) defines settlement pattern by using the term 'nucleated' instead of 'compact' whereas Blache and Finch called it 'clustered' and 'Compact' respectively.

Anas² (1954) has found that village and hamlet tend to avoid the low laying areas liable to inundation and seek dry points on some mound or elevated price of land.

Mukerji³ (1954) has discovered that clan solidarity of Jats and Gujars have held them together on compact sites. The Jats have everywhere captured the best lands. Their farms have the best soils and are located in first assessment circles adjoining the villages.

Clark and Evans (1954) have devised a new quantitative technique e-g measures pattern of rural settlements.⁴ This is called the nearest neighbour technique.

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⁴ Clark, P.J. and Evans, F.C., 'Distance to Nearest Neighbour as a Measure of spatial Relationship '. Population Ecology, Vol. 35, 1954, (pp.44-45).
Buschman (1954) investigated into the inter relationship between the settlement patterns and the house types in different regions of India.

Singh (1955) has gone through temporal analysis of village pattern and says that when one speaks of the village plan one refers to the layout of a basti (inhabited site) resulting from the arrangement of houses and village streets or lanes.

Singh (1955) has also analysed the spatial pattern of the society and culture, particularly with emphasis on clan organization against the geographical background, which has been further elaborated in his later works. He has tried to trace the progress of some Rajput clans from their migratory stage to settlements.

Thomson (1956) has applied the nearest neighbour technique in his study of the distribution of population.

Bhattacharya (1956) made a study of settlement patterns in the Upper Ganga Plain of Uttar Pradesh and attributed agglomerated pattern to caste affinities.

3. ibid, pp. 70-14.
Bradford (1957) focuses on settlement planning and says that Romans were much interested in it and had evolved a well-organized quadrate system.¹

Finch and Trewartha (1957) define the nucleated settlements as those which have all the dwellings of a mauza concentrated in one central site to form compact settlements, houses being clustered with each other. They called these settlements 'nucleated' or 'compact' while Blache calls them 'clustered' ² He also says that there is a close relationship between the relief features and the location of rural settlements and that dispersion increases in direct proportion to the ruggedness of the surface of the land.³

Bertrand (1958) observes that the strong Kinship relationships are major characteristics of the social structure in many rural areas of the U.S.A. Individual section of a dwelling site is primarily influenced by the location of the residence of another number of the family.⁴

Blache (1959) calls concentrated dwellings of a mauza in one central site of a compact settlement.⁵

Singh (1961) defines settlement as an occupance unit representing an organized colony of human beings including the buildings in which they live or work or store and the tracks or streets over which their movements

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take place. Even their rudimentary form as expressed by the temporary camp of the hunter or herder including the one wall house of the Semangs of Malaya reflect some human ingenuity with an imprint of the environment.¹

Yonekura (1961) made a comparative study of the rectangular village pattern in South India and Japan, and concluded that no single natural factor decides the village patterns. Regarding India's Villages he observed that they are generally agglomerated in type like that of East Asia.²

Bose (1961) observes that as such a settlement does not have any particular shape, it is known as irregular or amorphous. He called such a pattern a shapeless cluster³

Ahmad (1962) states that villages differ greatly from one another in shape and pattern by reason of contrast in the arrangement of streets and houses. As a matter of fact, the street system within a settlement is its most essential element. When houses are built in groups, the street often plays the decisive role and the houses face not the east nor the west but the highway the street or the road, Besides the street system other cultural

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elements such as a temples and mosques give a peculiar character to dwelling site.¹

Dacey (1962) focuses his attention on settlement pattern for which he adopts the Nearest Neighbour Distance technique.²

Chisholm (1962) observes that the religious minded have staunch faith in the existence of God or Deity, which sometimes is the basis of all settlements.³

Ahmad (1962) says that village ponds are great sources of water supply for drinking purposes for the cattle. Construction of houses and minor irrigation facilities in the nearby cultivable land. There is hardly a village without a pond in the entire Doab region. Ponds are the centres of rural activity where women come to fetch water and men to water their cattle. A few trees are grown near the ponds to provide shelter against the scorching heat of the sun. Thus these ponds become ideal places round which settlements were situated.⁴

Ullman and Dacey suggests that large centres have a far greater range of services and functions than smaller ones. Relationship between

size and functional range is curvilinear. With each new addition in population new functions are added.¹

Kirk. H. Stone, (1965) defines settlement Geography as the description and analysis of the distribution of buildings by which people attach themselves to the land and calls for a focus of attention on where the buildings are they and why are they there.²

Jones (1965) states that the pattern of settlement is determined on the basis of the location of houses and the highways. This shows the shape of a settlement. Villages represent a sort of growth within the physical and cultural setting of a region. The pattern of settlement exhibits the relationship between one dwelling and the other. Sometimes is irrespective of site. Often the pattern is unrelated to site. The site may also have no bearing on pattern.³

Dube, (1965) pointed out that from times immemorial the village has been the basic unit in the organization of Indian social polity. Yet the Indian village community cannot be regarded as static. Time and the interplay of historical and socio logical factors have influenced the structure, organization and ethos of these communities in many significant ways.⁴

Haggett Peter⁴, (1965) found that time is an important factor in determining the locations of settlements. With the lapse of time development have been taking place according to a variety of reasons, social, political and economic which have a direct bearing on human beings settlements.

Jones, (1965) observes that the location of a village is the expression of a combination of physical and cultural factors operating in the area concerned.²

Jordan, (1966) modifies the definition of settlement morphology (synonymous with “form of the cultural landscape”) and adds that “description of the form should come before explanation”. He defines settlement morphology in terms of vertical and horizontal dimensions as well as materials of composition.³

Perpillou, (1966) says that water supply is one of the most important and paramount factors in determining the location of rural settlements. Water being most necessary to men, animals and corps, man settles where it is available easily and in large quantities.⁴

Jan and John, (1967) found that settlement pattern denotes the shape or arrangement of settlement in relation to natural or man made features or designs such as streams, ridges, canals and roads.¹

Doxiadis, (1969) has given a theoretical framework for the formation of settlements. In this regard he sets forth five principles. The first principle is the maximization of man's potential contacts with the natural elements (water, trees). The second principle is the maximization of the efforts required for the achievement of man's actual and potential contacts. The third principle is the optimization of man's potential space at even movement individually or in a group. The fourth principle is the optimization of the quality of man's relationship with his environment consisting of nature, society, shells & networks. The fifth principle is man's organization of his settlements in an attempt to achieve an optimum synthesis of the previous four principles.²

Hudson (1969) makes a study of the arrangement of dwellings in worth eastern Georgia and some rural areas of the United States. It is clear that ideas of individual members of a family and other attitude, towards ideal locations have a direct bearing on the arrangement of dwellings.³

Mukherji (1970) has studied the cultural geography of Jats and has succeeded in tracing stages of Jats migration with emphasis on the origin, settlement pattern and nomenclature of their villages.¹

Singh (1971) has presented hypothesis new regarding settlement pattern. According to him religions ritual norms of the Hindu Society lead to the maximization of Socio-Spatial distance among the different caste groups. While the secular norms of behaviour, which are based on functional expediency, lead to the minimization of these distances.²

Tiwari (1972) mixes rural settlement Geography describing how the settlements are influenced by the rural landscape as well as by relationship as regard other aspects of rural life such as religion, rituals and social structures, economic functions as well as demographic characteristics.³

Nitz (1972) makes stimulating effort at evolving an outline and formulating a methodology for studying the evolution of rural settlement regions, using a comparative approach and making use of written records, archeological evidence, place names and field patterns. Nitz also pleads for the use of genealogical trees of rural families for reconstructing settlement processes and evolution of field patterns. The further suggests that

settlement genesis can be worked out by dating the periods with the help of place names.¹

Sharma (1972) says that houses and house types reflect with great exactitude the inter-relationship between man and his environment and tell about man's struggle for shelter through time and space. The study of house types is necessary as well as fascinating. The house is man's first step towards his adjustment to his environment. The house is man's first step towards his adjustment to his environment. The site of a house has a direct bearing on man's occupation. Water is most necessary to man, animals and crops. Man takes shelter where it is available easily and in large quantities. Religion is another major factor underlying the form, spatial arrangements and orientation of house.²

Nitz (1972) asserts that a kind of historical spatial settlement stratigraphy has been developed by name change analysis and this technique should be applied routinely in much settlement investigation.³

Sharma (1972) has attempted intervening distance analysis in an Indian desert on the basis of the formula given below.⁴

\[ 2(\cos -30')^{1/2} \times \left( \frac{\text{Area}}{\text{No. of villages and towns}} \right)^{1/2} \]

Sharma in a further study says that roads play important role in the location of anew settlement and also in the location of a new settlement and also in increasing the importance and size of a pre-existing settlement. In many cases recently, with the introduction of regular bus transport, road have acted as a factor promoting the growth of twin village type settlements.¹

Bhala (1973) studies the patterns of settlement and it led him to identify topography and social group as interacting determinates.²

Brook and Webb (1973) have found that aggregation of population and the growth of village have been closely favoured by conducive factors like agriculture, water supply and mutual, social and economic needs. Density of a settlement results mainly from the degree or intensity of land use. Besides according to them, close social relationships and warm neighbourly feelings of the village community and cooperative agricultural

\[
= \frac{\log^2}{2} - \frac{\log^3}{3} + \frac{\log \text{reality}}{2}
\]

\[
= 0.0312347 (\text{a constant}) + \frac{\log \text{reality}}{2}
\]
practices have strengthened the traditional cohesive character of the
settlements in the Ganga Yamuna Doab.¹

Singh (1973) has identified compact, semi-compact and hamlet types
of rural settlements, and correlates the types on the basis of the well known
physiographic and cultural factors.²

Mukerji, (1974) says that rural settlement studies have for a long
time shown a greater concern for types and patterns than for other
attributes. He has given another attribute— spacing of rural settlements.
With the help of a formula spacing may be easily calculated.

\[ S = 2\pi \left( \frac{A}{N^2} \right)^{\frac{1}{2}} \]

S represents spacing, A represents the area of study and N is the
number of rural settlement. Finally he has drawn the conclusion that there
is a positive correlation between low productivity, low density of rural
population, small villages and wider spacing.³

Mann (1974) describes the structure of rural settlement by applying
the means of settling processes with reference to the role of socio-historical
forces in their formation and function.⁴

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Mann (1974) also examines attributes other than morphology to know the spatial variation in the size of settlements. According to him, there are three parameters – population size, areal size and number of occupied house independently of spacing. Need for defence, cultivated area and transportation network are also related to the population size of the settlements.¹

Mukerji (1974) stresses that the site, situation and location are important attributes of rural settlements, playing their role in morphological evolution as well as in socio-spatial structures.²

Sen (1974) observes that site, situation and location are no doubt important attributes of the rural settlements. For example, people change their site in response to flood hazards. He also provided a fruitful guideline for studying the factors involved in the decision-making processes of a community for maximizing the futility of a site not merely in terms of morphology but also of function.³

Singh, R.L and Singh, R.B. (1975) have studies the morphogenesis of an Indian village with a Rajput clan settlement in Middle Ganga Valley.⁴

Bhattacharya (1975) correlates the settlement patterns of Deltaic West Bengal with physiography and agricultural land use. He has also worked out a convincing correlation of settlement pattern with micro-topographic variation. He asserts that deltaic settlements of the Middle Ganga Valley are not applicable to deltaic regions.¹

Singh, Rana (1975) suggests that varying degrees of regional and local dominance and sub dominance in any sphere, either caste, numerical, economical, educational, cultural or political, influence the settlement pattern.²

Edwards (1975) has studied Iberian settlement activities in America through questionnaires called Pelaciones Geographicas and in the ordenanzas de poblaciones of the codingo de India's.³

Hassan (1975) focuses his attention on functional analysis and has found that settlements generally present a good example of human adjustment to the geographical environment. So that fauna, flora, terrain, water bodies and climate, all have their impact on human culture.⁴

Singh, R.L. and Singh, R.B (1978) have found that old settlements are associated with physical features like rivers, because the earliest settlers followed the main watercourses and their tributaries upstream. Such findings appear valid in many pioneer zones of the world and even for landscapes, which have been quite altered with the passage of time.¹

Hassan (1980) says that geopolitical and national ideology have guided both pre-1948 and the post-1967 Jewish frontier settlements in Israel. According to him, each settlement stage was characterized by penetration into remote areas on the periphery of older established communities. In order to comprehend the development of Jewish frontier settlements three factors must be taken into account the historical geographic situation, the method of settlement and the spatial network of the settlements themselves.²

Berensten (1982) says that settlement pattern in the Federal Republic of Germany has undergone changes along democratic lines since 1945 due to the new policy of the Government. Greater impetus has been given to the rural areas and this has led to the stability of small rural


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centres at the expense of larger urban centers, which has brought about changes in both urban and rural areas, affecting the pattern of settlements.¹

Johannes Auget (1982) asserts that the politico-economic factors must be taken into consideration regarding the condition of rural settlements.²

Singh (1983) have studied the hierarchical systems and spatial patterns of central places in Baghpat tehsil on the basis of population size, central functioning and amenities available among rural settlements in the tehsil and the district.³

Nag (1984) have studied the evolution of Zambian settlements and planning in order to develop continuum of settlements, check rural urban migration, discourage squatter settlements, organize the country through settlements and highlight the possible trend for future settlements⁴.

Grover (1985) discusses the evolution of the Kanet landscape by selecting a sample village Behlon in the Morni Hill of Siwalik range in the state of Haryana. It is believed that Kanets belong to the Rajput caste having a distinct identity to their own. The Kanet settlement may be located

as a caste territory on a Kanet culture area since they are both numerically and in terms of lands ownership dominate.¹

Doxiadis's definition was given a new shape later in 1987 by Alexander B. Leman, who proposed a second definition, "human settlements are spatial / operational arrangements made by humans within certain scales, in order to support life and to pursue their aspirations, goals and targets."²

Nag (1990) has discussed interesting findings of Zambian settlements. He has studied spatial analysis and growth of population, rural development, urban settlements and urbanization, housing and squatter settlements in detail supported by suitable quantitative settlement analysis.³

Gill, M.S (1991) observed that centuries old compact village in Punjab are gradually moving toward dispersion because of some factors like the enhanced feeling of security, rapid economic growth, acceleration in the rate of population growth, rapid rise in aspiration levels especially among the younger and educated ruralites and lastly gradual spread of urbanisim.⁴

Singh (1996) has identified the rural settlement of Saryupar plain as compact, semi-compact, hamleted and dispersed settlements on the basis of various physico-cultural and socio economic factors.¹

The analysis of evolution of rural settlements and their spatial variation in an ancient settled region like the Meerut District is a difficult task, due to the complexity of successions, absorptions and interruptions by later settlers on the one hand, and lack of adequate data and records on the other. However, an attempt has been made in the present work to trace the evolution of rural settlements and their spatial variations in the Meerut District, with the help of the available sources and field studies.

The beginning of the rural settlements in the region goes back to the late Harappan period. Archaeological excavations at various sites of the District have revealed that the settlements of this region had begun around 1800 B.C. The earliest remains i.e., pottery belonging to the late Harappan period have been found at Alamgirpur. Then, successive cultural remains of different periods have also been recovered from different places in the region. Before the arrival of Aryans, Harappan culture was prevailed there. Harappan people were known as first settlers. There is at present, no indication from which direction the first settlers came. It is possible that they moved in from the hills and forests to the south of the Ganges, but the

more likely direction seems to have from west, in which event they would have moved eastwards down the river valleys. The Ganga valley seems to have been home of the Proto-Indics or Proto-Australoids and the Munda language. In early Sanskrit texts the inhabitants have been described as Nisadas, Bharatas and Savaras. The memory and traditions of these ancient people, particularly their later descendants, the Bhars, Soeris and Cherus are still presented in the region. The culture of the Harappans was succeeded by that of the semi-nomadic and pastoral Aryans who spoke Sanskrit and worshipped a group of gods led by India. The Aryan colonists from their first settlements in the Punjab gradually migrated southeast and eastwards down the Ganga valley. They gave up their nomadic habits and set up permanent settlements along the tributaries of big rivers. The dwellings in their settlements were made of wood and bamboo and they do not differ much from those found in the study area even today. The Aryan migration started in the region in the 9th BC, and had been completed by the end of the 7th BC. The region was at first affected by the migration waves of Rajput clans at the beginning of the twelfth century AD and migration of various corporate groups or clans on a much larger scale followed the Muslim invasion in 1192, when Qutb-ud-din Aibak captured the fortress of Meerut. Since, a wave of migration continued up to 18th century, each of which has left its imprints upon the study area, a distinct socio-economic and cultural those has emerged in it. It is rather difficult to trace
the patterns of ancient and medieval settlements until extensive excavations have been conducted, which is impossible on account of the high density of population in the region. So the existing rural settlements have been taken into consideration for spatial analysis.

It is observed that, throughout the human history the settlements have evolved in relation to topography and resources of the area. The majority of the people of the region live in villages. This is a clear indication of agricultural development and stability on the fertile Upper Ganga Yamuna Doab. Initially people lived in scattered hamlets, and later they clustered together in favourable spots either along the water courses or highways, which gave rise to the compact village type. Several historical and physico-cultural factors such as better means of transport and communication, efficient irrigation facilities and improvement of socio-economic conditions of the people together with the increase of population have been the main causes of the clustering of human habitats in many parts of the study area. In contrast to the compact type, there is the scattered type of rural settlement occurring in infertile tracts, usar infested areas, and areas with poor irrigation and transport facilities in the District. So the existing rural settlements have been taken into consideration for spatial analysis.
The rural settlements of the District do not appear to have been formed on a planned basis, but to have just grown. Some of the settlements are still found surrounded by walls, which indicates that they were established at a time when settlers needed protection from outside attack. Moreover, in most cases the shape of the village is roughly rectangular. Other geometrical shapes, such as square, semi circular and elongated are also found in some areas. A detailed description of the shapes of villages along with the layout of the village roads is to be found in a treatise on village plans, called "Mansara Shilpastra", believed to have been compiled in the fifth century B.C. It is therefore, very likely that some of the settlements conformed to the traditional village plans, indicating thereby that there has been a continuity in the growth of settlements from the Aryan period to the present time through ancient, medieval and modern periods in India in general and in the study area in particular. This is also corroborated by the fact that the villages of Buddhist time, like of those today, were compact and self sufficient and extended in the linear form along the principal waterways, with the decline of Buddhism and disappearance of rural republics by the end of 5th century AD, the compactness of village was broken and settlements got scattered into hamlets. During the medieval period, villages remained practically unchanged as the Muslim preferred to live in towns rather than in the countryside. With the establishment of the British rule, the village type
remained almost the same although the need for living within the village was no longer felt by the people due to the restoration of peace and security in the region. The surplus rural population came out of the village ramparts and established hamlets in the neighborhood of their fields.

The study area, Meerut District, one of the early settled regions of the country involves interesting patterns of human congregation for which it has been purposively selected for making a humble contribution to the growing field of Rural Settlement Geography. The District lies in the fertile Ganga Yamuna Doab. The District has an agrarian base and presents diverse physico-cultural and socio-economic conditions at micro-level in its different parts. It is one of the most ancient settled regions and has a long history of peopling and occupancy. Several archaeological findings, historical records and local legends pertaining to the pre-historic time, show that the study area was initially occupied by Bhils, Nagas, Khandus and other aborigines. Inspite of the intermixing of various ethnic groups and cultural traits from within and outside the study area has preserved its own traditions, culture, myths and related norms and values, which has resulted in shaping the uniqueness in its identity. It may be added that no serious study on the evolution and spatial variations of rural settlements has been made so far in the District.
Objectives

The objective of the present study is an analysis of the various aspects of the evolution of rural settlements and their spatial variations in the Meerut District. So as a first step, an understanding of certain basic issues becomes inevitable.

1. To study the physical, cultural and demographic parameters that give rise to variations in the meso and micro regions of the study area, as base for human settlements.

2. To trace the evolution of rural settlements from prehistoric times to modern period with the help of cultural ecology and place names analysis, and also to examine the territorial evolution of different clans in the study area between 1556 and 1874 A.D.

3. To deal with some salient characteristics of a few models of spatial diffusion, discuss the five-phase sequence of settlement diffusion of the Meerut District.

4. To interpret the distributional pattern and the inter-relationship among the rural settlements with the help of size (population and area), spacing (observed, expected and index of randomness) and other characteristics, through these findings an attempt has been made to measure the degree of concentration and dispersion and to classify the rural settlements in different types.
5. To study the factors that are responsible for the formation of different types of rural settlements in the study area.

6. To deal with the traditional view of shape analysis as well as the geometrical form of shapes, and to study the factors responsible for the formation of various patterns of rural settlements in the study area.

7. To identify rural house types on the basis of their building materials and sizes and to suggest suitable house plans for the District.

8. To analyse the social morphology of the selected villages (built-up areas) based on the religio-ritual and secular dominance models, and also to examine the influence of castes and dominant landownership on the spatial patterning of rural house in the study area.

9. Finally, to summarise all the observations made during the course of study and the net results thereof.

Methodology

In order to analyse the evolution of rural settlements and their spatial variations in Meerut District there are so many sources which are extremely helpful in providing significant clues to the understanding of the evolution of settlement patterns in the District e.g., archaeological findings, historical
sources, various written records, place names, culture, cults, folklore, maps, field surveys and interviews.

Archaeological findings comprises earliest remains i.e, pieces of ochre coloured pottery (OCP), black and red ware (BRW), painted grey ware (PGW), classical Northern Black Polished ware (NBPW) and Medieval glazed ware (MGW). A large number of terracotta male and female figurines, plaques, sculptural pieces, corroded coins, burnt bricks, fragmentary inscriptions on stones, statuettes, ruined brick stupas etc. have been found all over the study area. These evidences shed light on the sway of different dynasties from prehistoric period as well as ancient and medieval period. The antiquities recovered from the study area are well preserved in various museums under the supervision of Survey of India.

Written records include Ain-i-Akbari by Abul Fazl, Miscellaneous papers of revenue settlement, Institute Gazette, District Gazetteers, Gazetteers of North Western Provinces of Agra and Oudh, Memoirs North Western Provinces of India, Memoirs Statistical, Descriptive and Historical Account, Meerut and a large numbers of books on regional and local history. These are preserved in the state archives, revenue records rooms of the district and tehsil headquarters and libraries.

Culture, cults, folklore, legends, and oral history as narrated by the people, interviews and field surveys have been used to trace the place names of the villages.
To examine the spatial distribution and types of settlements in terms of spacing, degree of dispersion and concentration, quantitative techniques have been used in the following manner.

i) \[ D = 1.0746 \sqrt{\frac{A}{N}} \]

ii) \[ R_N = \frac{r_o}{r_e} \]

For the identification of settlement types, village and hamlet ratio as well as inter village spacing, density of village per 100sq. km. In relation to theoretical spacing together with survey of India Topographical sheets supplemented with field observations have been taken into consideration.

For the analysis of the pattern or shape of settlements both qualitative (classical), and quantitative (modern) approaches have been applied. Shapes of settlements have been measured taking 10% of villages as a sample on random basis, using the following formula.

\[ S = \frac{\hat{A}}{\pi R^2} \]

The shape analysis of settlements has also been made by taking into account the number of contacts between a village and its neighbouring villages. Dirichlet / Thiessen Polygons and Hexagons have been used for proper planning of rural settlements.
The composition of building materials has been taken into consideration for the classification of rural houses. Social morphology or spatial patterning of built-up areas of selected villages of different types belonging to different tehsils of discrete ecological settings at micro-level has been analysed on the basis of religio-ritual and secular dominance models.

The study is primarily based on fieldwork and analysis of relevant topographical sheets as well as orally recorded history. Fieldwork has involved extensive traversing through the study area with the aim of observing the landscape features of the study area. Observation of the landscape includes a careful examination of the village landscape, its settlement morphology, house types, building materials used, ground plans, modes of house construction and religious symbolism attached it to (if any) and general living conditions of the people. Such detailed work on the core elements of rural settlements has, however been limited to two selected villages.

The survey of India topographical sheets of the District on the scales 1:50,000 have formed the basis for studying the distribution, types and patterns of rural settlements in the study area. Similarly for a morphological study of the sample villages cadastral maps (scale 16"=1 mile) have been used, while the nearest neighbour analysis is based on the tehsil maps
contained in the District Census Handbook (1991), duly corrected, all the maps being joined together to form the District map. Various Atlases such as the National Atlas, Uttar Pradesh in Maps, Census Atlas of U.P, and Atlas of Mughal Empire, have also been used for drawing the outlines of the District and for identifying the territories of the study area during the medieval period.

The collected data, both primary and secondary has been presented in tabular form and analysed, using different quantitative techniques to derive specific conclusions regarding dispersion, spacing, shape analysis and settlement types. Sample choropleth mapping has been adopted throughout the work. A plethora of tables has been avoided by cartographic representation. Community Development Blocks have been chosen as areal units for the analysis of rural settlements. Nearest neighbour distances for all the villages of the study area have also been measured.

Organisation of Chapters

The entire study is divided into following six chapters excluding introduction and conclusions.

The Introduction deals with the meaning, scope, various approaches of the rural settlements, a review of relevant literature and references, importance of the study, selection of the area, objectives, methodology and the organization of chapters.
The first chapter gives the brief introduction of the area, its physical, cultural and demographic setting with emphasis on physiography, geology, drainage, climate, soil and cultural attributes, e.g., land use, cropping pattern, irrigation, transport and communication, manufacturing activities and rural market centres. It also provided with the demographic structure and distribution of castes in the District.

The second chapter deals with the historical perspective concerning the evolution of rural settlements of different periods, taking into account the place name analysis, archaeological evidences, travel accounts of different people and historical legends. It also deals with the evolution of territorial units through land occupancy of various zamindars, clans or corporate political group between the sixteenth and the nineteenth century, who functioned as the dominant local power in different parts of the region and always occupied the best available sites of the territory and allowed other, non-corporate group of men and women to settle on lands given to them to carry out their socio-economic activities within its organizational framework.

In the third chapter an attempt has been made to study the spatial distribution of rural settlements. The distribution of rural settlements is affected by several factors in which the relief, distribution of resources, population, land under cultivation, types of agriculture, development of road network, localization of resources, political decisions and cultural bonds are
the important factors on the distribution of rural settlements in the Meerut District. The spatial pattern of rural settlements has been studied quantitatively by using quantitative techniques.

The chapter fourth examines the various patterns of rural settlements found in the study area in response to the physical and cultural factors. These patterns have been identified on the basis of the Survey of India topographical sheets and have been checked and modified with the help of village cadastral maps and through personal observation, wherever possible. Shape analysis of the villages has been based on quantitative techniques, taking into account 10% of sample villages on random basis. Further, relationship among contact index, population density and areal size of the villages has been studied. The present researcher has recommended that thiessen polygons and hexagons be adopted as model while planning the development of the villages in the study area.

Fifth chapter has been devoted to study the rural house types and building material. The Indian village bounded by agricultural land with different types of building materials and house types in the regional settings. Human dwellings are governed by tradition and cultural elements of the time and they form one of the most basic elements in the cultural landscape and hold a significant place in the geographical analysis of settlements. House is a symbol of regionalism representing social, cultural and economic
organisation of its people. In this chapter present researcher has attempted to find out the impact of various physical and cultural factors on the patterns of house and the type of building material used in the study area. Suitable rural house plan and a few remedial measures have been suggested for improving the village environment.

Chapter sixth seeks to analyse the social morphology of two selected villages (built-up area), based on the religio-ritual and secular dominance models. The influence of castes and dominant land-ownership on spatial patterning of rural houses of these two selected villages of the District have been examined through field observation.

Lastly the conclusions have been drawn and the recommendations have been made for the rational planning of rural habitat in the study area.